The Cotton Crop and its Price
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the ground that they contribute to the size of the production of industry. He then pointed out that a more valid comparison was not between physical output and real earnings but between value product and real earnings, and explained the method whereby he derives for industry as a whole and for sub-divisions of industry indexes of per capita value product. By then comparing his new indexes with that of real earnings he comes to two conclusions. First, "that it was not until 1921 that the workers in manufacturing industries produced on the average more purchasing power than in 1899" and second, "when the real earnings of the employees are compared with the average amount of value produced in the respective years, it is seen that instead of real earnings lagging constantly behind, they rose up to 1919 very much more rapidly."

The discussion was led by Mr. Leo Wolman. An analysis of the relation between wages paid and value added by manufacture, he said, would lead to conclusions quite different from those drawn by Mr. Falkner. From 1921 to 1925, for example, the ratio of wages to value added fell from 44.8 per cent to 40.07 per cent, a drop of roughly one-ninth. This drop was to be expected in view of the great increase in per capita output and the attendant cutting of manufacturing cost. The central problem involved in comparing physical value with real earnings lies in the difficulty of obtaining satisfactory figures for the number of people on the payroll, since the number reported on the payroll does not vary with the amount of work done. Mr. Henry S. Dennison held also that quite a different face might be put on the per capita output figures if statistics of the number of workers employed were replaced with statistics of total hours worked. The discussion was ended by Mr. John R. Commons, who missed in the papers of the evening consideration of the social implications of these statistical inquiries. From a social standpoint, he said, the crucial factor was the number of persons unemployed and no comparisons that did not take their numbers into consideration can claim to be regarded as telling the most important part of the story.

L. W.

THE COTTON CROP AND ITS PRICE

A Dinner Meeting of the American Statistical Association was held on Friday evening, April 20, 1928, at the Aldine Club, 200 Fifth Avenue, New York City, attended by about 125 persons. Mr. Gardiner H. Miller, Vice-President of the New York Cotton Exchange, presided.

The first speaker was Mr. W. F. Callander, Chief, Crop Reporting Board, United States Department of Agriculture. He stated that cotton was one of the first crops for which the Government began to issue crop reports, but that it was not until 1915 that forecasts of the crop were issued prior to harvest. "No other reports of the Department have been so severely criticized, although for no crop has the Department spent as much money or worked as hard to get the facts." He stated that much of this criticism has been due to misunderstanding of the character of the reports, which in reality have not been forecasts but have been based on the assumption that subsequent conditions would be average. Mr. Callander divided the problem connected with the reporting of the crop into two classes, those having to do with acreage and those having to do with forecasting of the yield per acre.

Until a few years ago estimates of acreage were based very largely upon judgment inquiries and personal observation, but these judgment inquiries often led to error, particularly in years when there was extensive propaganda to reduce acreage, and since that time the Board has endeavored to develop other methods less subject to bias.

About ten years ago a system of reports from thousands of individuals was started. This at first led to underestimate of acreage, but experience has shown that there was a rather constant bias for which allowance is now made. Other refinements have also been used. Further light on the acreage problem is afforded by sales of fertilizer, there being a close correlation between fertilizer sales and acreage, particularly in the southeastern cotton states.

The principal innovation of recent years, however, has been the invention of the crop meter, by means of which the linear feet of various crops may be measured on one or both sides of the road on selected routes. Later trips over the same routes give a valuable measure on abandonment.

The Board is now endeavoring to secure authority and funds from Congress to make a partial census of every county in the cotton belt each year, and has made studies which show that a farm to farm canvass of from 8 to 10 per cent of the total acreage in each county would afford a reliable sampling. The state of Alabama has already made an annual appropriation for such acreage surveys.

In regard to the estimation of the yield per acre, Mr. Callander stated that the boll weevil had necessitated modifications in previous methods. Various means have been devised to determine the proper allowance for possible damage from this source, a study having shown that the boll weevil was not only the dominating factor causing variation in yields per acre but also that there was a tendency for the damage to run in cycles. Other indications of probable production are afforded in boll counts, stand and size of bolls.

Mr. Callander concluded by stating that the Crop Reporting Board is constantly working out further improvements and is exerting every effort to improve the value of the service.

The second speaker was Mr. E. C. Morse of the Cotton-Textile Institute, who, after giving some figures indicating the magnitude and importance of the cotton industry described the organization and aims of the Institute. Its activities fall into three principal groups—Cost Accounting, Statistical, and New Uses. The New Uses section is not confined to work indicated by its name, but also has general supervision over research, specifications, simplified practice, standardization and test methods.

Mr. Morse described some of the New Uses which have been developed such as the use of cotton fabrics in traffic control and paving, and described the methods that are being followed to increase consumption of cotton for use in bagging, belting, clothing and the like.

The third speaker was Mr. L. H. Bean, Agricultural Economist, United States Department of Agriculture, who spoke on certain inter-relationships between the supply, price and consumption of cotton and described how it had been possible by taking certain series of data representing supply and demand to determine not only the average effect of a change in any one of these factors on the price of cotton but also that the factors selected are those which usually determine the price, and in the aggregate explain about 90 per cent of the total variations occurring in the period from 1905 to 1926.

Mr. Bean divided the findings of his studies into two groups—(1) those which show that supply affects price and (2) those which show that price affects supply, and summarized his paper as follows:

> *Supply affects price:* The total supply (crop and carryover) which is usually known at the beginning of the season very largely determines the average level of prices for the year. The size of the crop and the probabilities as to the size of the following crop determine the major monthly movements during the course of the crop season.
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> *Price also affects supply:* Price is a very important element in the following year's acreage. It influences yield in the following year through the amount of fertilizer bought by farmers, and it affects the rate of consumption and the amount of the world carryover at the end of the season.
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> *Consumption affects price:* Large volumes of cotton and cotton goods in channels of consumption secured at low prices act as a depressing factor, and low volumes as a stimulating factor on subsequent cotton prices.
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> *Price also affects consumption:* Low prices during the course of a season result in increased mill purchases and in a higher domestic and world mill consumption of cotton. High prices have the reverse effect. In the United States low prices during a given period of six months are followed by increased mill consumption of cotton and high prices are followed by a reduction during the following six months.

The fourth speaker was Mr. C. T. Revere, of Munds and Winslow, Members New York Cotton Exchange. Mr. Revere, after indulging in some early reminiscences in a humorous vein, described the influence of organized Exchanges on the price of cotton, but thought that this was a subject which would probably lend itself better to psychological rather than statistical analysis. "Cotton research is the paradise of the mathematician, but when all is said and done, the ultimate reaction is psychology," and "in the long run, economic forces determine values, but in the meantime emotion makes the market."

Mr. Revere dwelt on the need of organized speculation as a risk-bearer or as insurance against price changes, and likened the criticism of the Exchanges for not preventing violent price swings to criticism of fire insurance for not preventing a building from burning down. His conclusion based on more than twenty years' observation was that the market pays more attention to future policies than past history. "Organized speculation is never interested in water that has gone over the dam, but it is able to see a flood coming down the Mississippi long before the high water has reached Keokuk, Iowa."

Mr. Revere maintained that fluctuations in price would be much more violent without organized trading because of its tendency to discount the future. It "exercises a prophetic function that constitutes one of its most valuable services" and it "pays the highest premium on foresight, for in the solution of its problems, speculative vision is more powerful than a dozen admitted facts."

The discussion that followed consisted of a critical review of the four papers by Mr. A. W. Zelomek, of the Fairchild Textile Service, and a discussion by Mr. K. W. Jappe, of the Brookmire Economic Service, of a portion of Mr. Bean's paper, in which it was pointed out that a study of the relationship of cotton to the level of all commodities gave some valuable indications of sound buying levels in the price of cotton.

In the discussion from the floor, the questions raised were concerned principally with Mr. Callander's paper and covered mainly the determination of the "pars" and the value of such items as the boll weevil cycle, boll counts and the like as a basis for estimating the crop.

K. W. J.

THE ANALYSIS OF DATA AMONG BUSINESS ORGANIZATIONS

The Sixth Dinner Meeting of the San Francisco Chapter was held on Friday evening, February 17, 1928, at the Bellevue Hotel in San Francisco. Thirty-eight members and guests were present.

The topic for discussion was "The Analysis of Data Among Business Organizations." President Mowbray introduced the speakers of the evening.

The first speaker was Mr. G. C. Bishop of the Statistical Department, The Pacific Telephone and Telegraph Company. His remarks were as follows:

One function of the Statistical Department is the making of estimates of certain accounts for the ensuing year by months and it is in connection with this work that we have found one general method of analysis most satisfactory.

The data analyzed are, in most cases, only available over short periods, or if more ample, display marked changes in the rate of growth. In addition, there are changes resulting from frequent improvements in the art of communication which make it difficult to obtain comparable series for any length of time.

From the standpoint of efficiency, it is desirable to have the personnel thoroughly familiar with some general method of analysis which is applicable in the majority of cases to the data available and which requires the minimum amount of labor and time necessary to obtain satisfactory results.

In the case of the seasonal index, the link-relative method has been found most satisfactory. It permits the use of the entire data; makes sufficient allowance for the distortion due to the presence of the cycle; and admits of an index being obtained without a trend line, the calculation of which is sometimes difficult owing to the short period available or because it is necessary first to correct for seasonal variation in order to determine the best period on which to base a trend. This method is less laborious than any based on moving averages, but is more so than those based on percentages to trend or percentages to annual average. The latter methods, however, have disadvantages which are indicated above.

For trends the less flexible curves have proven most satisfactory, probably due to the short periods used.

It is not intended to convey the impression that the method indicated is advisable or necessary in all cases, for shorter methods may be used frequently, and at times, when analyzing certain types of data, the link-relative method cannot be used. But for a general method which is applicable in most cases, the foregoing has been found satisfactory from all angles.

The second speaker was Mr. Donald S. Thompson of the Division of Analysis and Research, Federal Reserve Bank of San Francisco.